UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/869,351	06/28/2001	Jean-Luc Lacour	034299-332	4014

7590 12/09/2002

Robert El Krebs
Thelen Reid & Priest LLP
P.O. Box 640640
San Jose, CA 95164-0640

EXAMINER
ROWE, JESSE C

ART UNIT	PAPER NUMBER
2872	

DATE MAILED: 12/09/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/869,351	LACOUR ET AL.
	Examiner	Art Unit
	Jesse C Rowe	2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *6/28/2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 June 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Specification

The abstract of the disclosure is objected to because Line 11, "Figure 1." appears to be a typo. Correction is required. See MPEP § 608.01(b).

Claim Objections

Claim 1 objected to because of the following informalities:

In claim 1, line 8, the word "analysed" is misspelled.

In claim 1, line 26, the word "analysing" is misspelled.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Regarding claim1, line 6, the phrase "possibly" renders the claim indefinite because it is unclear whether the limitation(s) following the phrase actually are part of the claim or not part of the claim.

Regarding claims 5 and 13, line 2 and line 1 respectively, the phrase "capable to" renders the claim indefinite because it is unclear whether the limitation(s) following the phrase actually are part of the claim or not part of the claim.

Regarding claims 7 and 15, line 2, the phrase "capable of" renders the claim indefinite because it is unclear whether the limitation(s) following the phrase actually are part of the claim or not part of the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1 and 7 rejected under 35 U.S.C. 103(a) as being unpatentable over Singh et al (USPN 5,781,289) in view of Koester et al (USPN 5,026,159).

Regarding claim 1, Singh et al discloses an elementary analysis device by optical emission spectrometry on laser produced plasma. this device being characterized in that it comprises a pulsed laser source (1), a second optical means (5) and an object to be analyzed (6). Singh et al also discloses a means (11, see Intensified Diode Array Detector and Spectrograph) of analyzing a light radiation spectrum emitted by the plasma and a means (11, computer) of determining the elementary composition of the object starting from this spectrum analysis (column 7, lines 17-27). Singh et al lacks a diaphragm usable for selecting part of the laser beam emitted by the source, and delimiting the shape of the impact of the laser beam on an object to be analyzed, this laser beam not being focused in the plane of the diaphragm. Singh et al also lacks a first optical means capable of projecting the image of the diaphragm to infinity. and wherein the second optical means receives the image of the diaphragm projected to infinity by the first optical means and focusing it on the object to be analyzed. Singh et al also lacks wherein the image of the diaphragm focused on the object is equal to the required dimension on this object and wherein the focal point of the laser beam, after crossing through the diaphragm and the first

and second optical means, is outside the image plane of the diaphragm. Koester et al discloses a diaphragm (28) usable for selecting part of the laser beam emitted by the source, and delimiting the shape of the impact of the laser beam on the object to be analyzed, this laser beam not being focused in the plane of the diaphragm (See Figure 1). Koester et al also discloses a first optical means (106) capable of projecting the image of the diaphragm to infinity. Neither Singh et al or Koester el al separately disclose wherein a second optical means is designed to receive the image of the diaphragm projected to infinity by the first optical means and focusing the diaphragm on the object to be analyzed, wherein the focal point of the laser beam, after crossing through the diaphragm and the first and second optical means, is outside the image plane of the diaphragm, and wherein the image of the diaphragm focused on the object is equal to the required dimension on the object. However, the combination as disclosed above inherently has a second optical means (5, Singh et al) designed to receive the image of the diaphragm (28, Koester et al) projected to infinity by the first optical means (106, Koester et al) and focusing the diaphragm on the object to be analyzed to produce plasma on the surface of this object (Singh et al; column 5, lines 23-29), wherein the focal point of the laser beam, after crossing through the diaphragm and the first and second optical means, is outside the image plane of the diaphragm (the beam is focused at the object to produce a plasma), and wherein the image of the diaphragm focused on the object is equal to the required dimension on this object. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the light emitted from the laser of Singh et al to include the diaphragm and first optical means as taught by Koester et al to change the energy intensity of the laser on the object.

Regarding claim 7, Singh et al discloses wherein the second optical means are refractive optical means comprising a microscope objective (5). Singh et al lacks wherein the diaphragm comprises a circular aperture that selects the central part of the laser beam output from the laser source, and the first optical means are refractive optical means. Koester et al discloses wherein the diaphragm (28) comprises a circular aperture that selects the central part of the laser beam output from the laser source (column 4, lines 13-15; Figure 1), and the first optical means are refractive optical means (See Figure 1). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the light emitted from the laser of Singh et al to include the diaphragm as taught by Koester et al and to include a refractive first optical means as taught by Koester et al to obtain a more uniform light from the laser and to reduce cost. respectively.

Claim 2 rejected under 35 U.S.C. 103(a) as being unpatentable over Singh et al in view of Koester et al as applied to claim 1 above, and further in view of Lehureau (USPN 5,657,304).

Regarding claim 2, Singh et al in view of Koester et al disclose the instant invention but lacks wherein the second optical means has a digital aperture equal to approximately 0.1 or greater. Lehureau discloses a digital aperture greater than 0.1 (column 1, lines 47-50). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the second optical means of Singh et al in view of Koester et al to include a digital aperture as taught by Lehureau to reduce mechanical failures.

Claims 3 and 5 rejected under 35 U.S.C. 103(a) as being unpatentable over Singh et al in view of Koester et al as applied to claim 1 above, and further in view of Sabsabi et al (USPN 6,008,897).

Regarding claims 3, Singh et al in view of Koester et al disclose the instant invention but lacks wherein the impact size of the laser beam on the object is greater than or equal to 1 um. Sabsabi et al discloses wherein the impact size of the laser beam on the object is greater than 1 μm (column 7, lines 5-6). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the impact size of the laser beam of Singh et al in view of Koester et al to be greater than 1 μm as taught by Sabsabi et al to obtain the correct energy densities in the beam to form a plasma.

Regarding claim 5, Singh et al in view of Koester et al disclose the instant invention but lacks wherein the pulsed laser source emits ultraviolet light. Sabsabi et al discloses wherein the source emits ultraviolet light (column 7, lines 10-11). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the pulsed laser source of Singh et al in view of Koester et al to be ultraviolet as taught by Sabsabi et al to effectively penetrate for a longer period the developing plasma and reach the target surface for maximum laser ablation (column 6, lines 51-61).

Claim 4 rejected under 35 U.S.C. 103(a) as being unpatentable over Singh et al in view of Koester et al as applied to claim 1 above, and further in view of Sabsabi et al (USPN 5,781,289).

Regarding claims 4, Singh et al in view of Koester et al disclose the instant invention but lacks wherein the displacement frequency of the object between two laser pulses of the source is

greater than or equal to 15 Hz. Sabsabi et al discloses wherein the displacement frequency of the object between two laser pulses of the source is greater than 15 Hz (column 7, lines 46-63). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the displacement frequency of the object as disclosed by Singh et al in view of Koester et al to be greater than 15 Hz as taught by Sabsabi et al to increase the number of samples that are measured.

Claims 6 and 15 rejected under 35 U.S.C. 103(a) as being unpatentable over Singh et al in view of Koester et al as applied to claim 1 above, and further in view of Magee et al (USPN 4,758,533).

Regarding claims 6, Singh et al in view of Koester et al lacks wherein the relative variation of energy between 1 laser pulse and the next does not exceed 5%. Magee et al discloses wherein the relative variation of energy between 1 laser pulse and the next does not exceed 5% (column 7, lines 63-65). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the laser of Singh et al in view of Koester et al to have the energy variation as taught by Magee et al to have a more consistent quality of analysis.

Regarding claim 15, Singh et al discloses wherein the second optical means are refractive optical means comprising a microscope objective (5). Singh et al lacks wherein the diaphragm comprises a circular aperture that selects the central part of the laser beam output from the laser source, and the first optical means are refractive optical means. Koester et al discloses wherein the diaphragm (28) comprises a circular aperture that selects the central part of the laser beam

output from the laser source (column 4, lines 13-15; Figure 1), and the first optical means are refractive optical means (See Figure 1). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the light emitted from the laser of Singh et al to include the diaphragm as taught by Koester et al and to include a refractive first optical means as taught by Koester et al to obtain a more uniform light from the laser and to reduce cost, respectively.

Claim 8 rejected under 35 U.S.C. 103(a) as being unpatentable over Singh et al in view of Koester et al in view of Official Notice.

Singh et al in view of Koester et al lacks wherein the first and second optical means are anti-reflection treated for reflections at the wavelength of the light emitted by the laser source. Official Notice is taken that making lenses with anti-reflection coatings are well known in the art and are readily available. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to make the first and second optical means of Singh et al in view of Koester et al anti-reflective at the wavelength of the laser to minimize reflection and to maximize the laser's throughput.

Claims 9 rejected under 35 U.S.C. 103(a) as being unpatentable over Singh et al in view of Koester et al as applied to claim 1 above, and further in view of Andre et al (USPN 5,583,634).

Singh et al in view of Koester et al lacks wherein a means of blowing a gas jet onto the object. Andre et al discloses a means of blowing a gas jet onto the object (column 2, lines 55-

67). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the elementary analysis device of Singh et al in view of Koester et al to include a means of blowing a gas jet onto the object as taught by Andre et al to create more favorable conditions spectral analysis (column 2, lines 60-62).

Claim 10 rejected under 35 U.S.C. 103(a) as being unpatentable over Singh et al in view of Koester et al as applied to claim 1 above, and further in view of Svanberg et al (USPN 4,786,813).

Singh et al in view of Koester et al discloses a mirror (4; see Singh et al) reflecting at the wavelength of the laser source and transparent at other wavelengths (see Singh et al; column 6, lines 42-47), and the mirror being placed on the light path between the first and second optical means and designed to reflect almost the entire laser beam to these second optical means and to transmit an image of the object to the observation means (10; see Singh et al). Singh et al in view of Koester et al lacks a means of observing the object, so that the object can be placed in the image plane of the diaphragm. Svanberg et al discloses a means of observing the object (see Figure 1; column 2, lines 57-68) in the image plane (4). In the combination of Singh et al in view of Koester et al and further in view of Svanberg et al, the image plane of the diaphragm would be in the image plane (4). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the system of Singh et al in view of Koester et al to include a means of observing the object to ensure correct placement of the object for analysis.

Claim 11 rejected under 35 U.S.C. 103(a) as being unpatentable over Singh et al in view of Koester et al and further in view of Lehureau as applied to claim 1-2 above, and further in view of Sabsabi et al (USPN 6,008,897).

Singh et al in view of Koester et al and further in view of Lehureau disclose the instant invention but lacks wherein the impact size of the laser beam on the object is greater than or equal to 1 um. Sabsabi et al discloses wherein the impact size of the laser beam on the object is greater than 1 μm (column 7, lines 5-6). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the impact size of the laser beam of Singh et al in view of Koester et al and further in view of Lehureau to be greater than 1 μm as taught by Sabsabi et al to obtain the correct energy densities in the beam to form a plama.

Claim 12 rejected under 35 U.S.C. 103(a) as being unpatentable over Singh et al in view of Koester et al and further in view of Sabsabi et al (USPN 6,008,897) as applied to claim 1 and 3 above, and further in view of Sabsabi et al (USPN 5,781,289).

Singh et al in view of Koester et al and further in view of Sabsabi et al (897) disclose the instant invention but lacks wherein the displacement frequency of the object between two laser pulses of the source is greater than or equal to 15 Hz. Sabsabi et al (289) discloses wherein the displacement frequency of the object between two laser pulses of the source is greater than 15 Hz (column 7, lines 46-63). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the displacement frequency of the object as disclosed by Singh et al in view of Koester et al and further in view of Sabsabi et al (897) to be greater than 15 Hz as taught by Sabsabi et al (289) to increase the number of samples that are measured.

Claim 13 rejected under 35 U.S.C. 103(a) as being unpatentable over Singh et al in view of Koester et al and further in view of Sabsabi et al (USPN 5,781,289) as applied to claim 1 and 4 above, and further in view of Sabsabi et al (USPN 6,008,897).

Singh et al in view of Koester et al and further in view of Sabsabi et al (289) disclose the instant invention but lacks wherein the pulsed laser source emits ultraviolet light. Sabsabi et al (897) discloses wherein the source emits ultraviolet light (column 7, lines 10-11). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the pulsed laser source of Singh et al in view of Koester et al and further in view of Sabsabi et al (289) to be ultraviolet as taught by Sabsabi et al (897) to effectively penetrate for a longer period the developing plasma and reach the target surface for maximum laser ablation (column 6, lines 51-61).

Claim 14 rejected under 35 U.S.C. 103(a) as being unpatentable over Singh et al in view of Koester et al and further in view of Sabsabi et al (USPN 6,008,897) as applied to claim 1 and 5 above, and further in view of Magee et al (USPN 4,758,533).

Singh et al in view of Koester et al and further in view of Sabsabi et al disclose the instant invention but lacks wherein the relative variation of energy between 1 laser pulse and the next does not exceed 5%. Magee et al discloses wherein the relative variation of energy between 1 laser pulse and the next does not exceed 5% (column 7, lines 63-65). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the laser of

Singh et al in view of Koester et al and further in view of Sabsabi et al to have the energy variation as taught by Magee et al to have a more consistent quality of analysis.

Claim 16 rejected under 35 U.S.C. 103(a) as being unpatentable over Singh et al in view of Koester et al and further in view of Official Notice as applied to claim 1 and 7-8 above, and further in view of Andre et al (USPN 5,583,634).

Singh et al in view of Koester et al and further in view of Official Notice disclose the instant invention but lacks wherein a means of blowing a gas jet onto the object. Andre et al discloses a means of blowing a gas jet onto the object (column 2, lines 55-67). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the elementary analysis device of Singh et al in view of Koester et al and further in view of Official Notice to include a means of blowing a gas jet onto the object as taught by Andre et al to create more favorable conditions spectral analysis (column 2, lines 60-62).

Claim 17 rejected under 35 U.S.C. 103(a) as being unpatentable over Singh et al in view of Koester et al and further in view of Andre et al (USPN 5,583,634) as applied to claim 1 and 9 above, and further in view of Svanberg et al (USPN 4,786,813).

Singh et al in view of Koester et al and further in view of Andre et al discloses a mirror (4; see Singh et al) reflecting at the wavelength of the laser source and transparent at other wavelengths (see Singh et al; column 6, lines 42-47), and the mirror being placed on the light path between the first and second optical means and designed to reflect almost the entire laser beam to these second optical means and to transmit an image of the object to the observation

means (10; see Singh et al). Singh et al in view of Koester et al and further in view of Andre et al lacks a means of observing the object, so that the object can be placed in the image plane of the diaphragm. Svanberg et al discloses a means of observing the object (see Figure 1; column 2, lines 57-68) in the image plane (4). In the combination of Singh et al in view of Koester et al and further in view of Svanberg et al, the image plane of the diaphragm would be in the image plane (4). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the system of Singh et al in view of Koester et al and further in view of Andre et al to include a means of observing the object to ensure correct placement of the object for analysis.

Conclusion

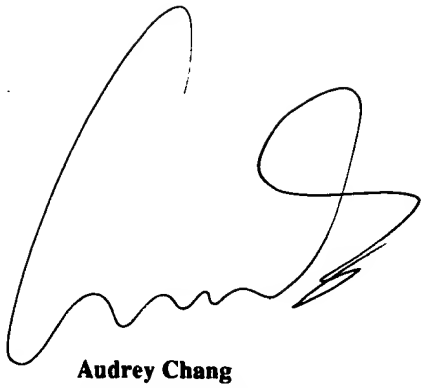
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jesse C Rowe whose telephone number is (703)305-7018. The examiner can normally be reached on Regular M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cassandra Spyrou can be reached on (703)308-1687. The fax phone numbers for the organization where this application or proceeding is assigned are (703)305-7018 for regular communications and (703)305-7018 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-7018.

JR JR

December 4, 2002



Audrey Chang
Primary Examiner
Technology Center 2800